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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

June 20, 2007

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

FROM: Steve Fluke, Team Lead, Senior Reclamation Hydrogeologist

RE: Waste Rock Pile Expansion, Canyon Fuel Company, LLC, Skyline Mine, C/007/0005, Task ID #2800

SUMMARY:

Canyon Fuel Company, LLC, (CFC, the Permittee) submitted an amendment to the Skyline Mine Mining and Reclamation Plan (MRP) on May 4, 2007 in order to expand their current Waste Rock Disposal Site (Task ID #2800). The expansion of the waste rock pile (WRP) includes the addition of approximately 12.5 acres of new lease area and an increase of approximately 5.13 acres of disturbed area. The new lease area includes the addition of ditches and swales along the access road. The existing sedimentation pond with a change in height to its decant pipe is proposed to contain the runoff from the WRP area. This review covers the hydrologic aspect of the MRP amendment and deficiency response.

The amendment does not meet the requirements of relevant R645 coal rules for hydrology. Deficiencies identified in this memo need to be addressed prior to approval.

TECHNICAL ANALYSIS:

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

General

The Skyline Mine waste rock pile (WRP) expansion amendment includes additional disturbed area that reports to an existing sedimentation pond and additional ditches and swales within the expanded permit area along the access road that are part of alternative sediment control area (ASCA) 24. The Utah Division of Water Quality (DWQ) currently permits the sedimentation pond.

Water-Quality Standards And Effluent Limitations

The Skyline Mine MRP presents the EPA issued NPDES permit UT-0023540 in two sections: Volume 1, Section 2.3, Exhibit 2.3-1; and Volume A-1. Both permits have expired and do not indicate an outfall for the WRP sedimentation pond. Table 2.3.7-3 of Section 2.3 of the MRP lists four NPDES outfalls for the Skyline Mine including outfall 003 for the Waste Rock Area. The MRP does not list sampling requirements, including effluent limitations, for current UPDES outfalls. The existing UPDES permit should be included and expired NPDES permits should be removed from the MRP.

Diversions: Miscellaneous Flows

All diversions (drainage controls) within the WRP permit area consist of ditches and swales as shown on Plates 3.2.8-1 and 3.2.8-4. Plate 3.2.8-1 of the amendment shows five swales (SW-13, 14, 17, 18, and 19) and seven ditches (UD-6A, UD-6B, and UD-6C, UD-4, UD-7, DD-14, and DD-15) that do not report to the sedimentation pond. Design and calculations for these diversions should be presented in Volume 5, Section 14 of the MRP, Drainage Control Waste Rock Disposal Site. This section should be updated to show the proposed and/or existing drainage controls within the WRP permit area.

Two ditches, DD-16 and DD-17, divert runoff to the WRP sedimentation pond. Ditch DD-16 is divided into two sections; upper DD-16 and lower DD-16. Design criteria for the diversions are presented in Volume 5, Section 15a of the MRP amendment submittal in a report prepared by Earthfax Engineering, Analysis of Sedimentation Pond Capacity Following Waste Rock Pile Expansion, Skyline Mine, Scofield, Utah. The report demonstrates that the ditches are designed for peak flow depths and velocities in response to the 10-yr, 6-hr precipitation event as required for a permanent diversion of a miscellaneous flow (R645-301-742.333). (The ditches will remain following final reclamation.) Hydraulic calculations determined with HydroCAD 2005 software are presented in Appendix C of the report. Ditch designs are presented in Table 3 of the report. The ditches are considered non-erosive with peak flow velocities calculated below five feet-per-second (fps). The upper DD-16 ditch was assumed to be self-armored with $D_{50} = 4$ inch riprap from the accumulation of material from the WRP. The Permittee commits to closely monitoring the channel to ensure that this assumption is correct.

Two ditches, DD-16 and DD-17, divert runoff to the WRP sedimentation pond. Ditch DD-16 is divided into two sections; upper DD-16 and lower DD-16. Design criteria for the diversions are presented in Volume 5, Section 15a of the MRP amendment submittal in a report prepared by Earthfax Engineering, Analysis of Sedimentation Pond Capacity Following Waste Rock Pile Expansion, Skyline Mine, Scofield, Utah. The report demonstrates that the ditches are designed for peak flow depths and velocities in response to the 10-yr, 6-hr precipitation event. However, ditches that receive runoff from a refuse pile must be designed to safely pass the runoff from a 100-yr, 6-hr precipitation event (R645-301-746.212).

Siltation Structures: General

The sedimentation pond is the only siltation structures within the Skyline Mine WRP permit area. The existing sedimentation pond dimensions were resurveyed by CFC to use in the modeling calculations for the expanded WRP. The sedimentation pond design calculations are presented in Volume 5, Section 15a of the MRP amendment submittal in a report prepared by Earthfax Engineering, Analysis of Sedimentation Pond Capacity Following Waste Rock Pile Expansion, Skyline Mine, Scofield, Utah. The sedimentation pond is described in Section 3.2.1, Rock Disposal Sediment Pond, and shown on Map 3.2.8-2.

A certification statement for the WRP sedimentation pond, dated March 15, 1991, is located in Section 3.2 of the MRP (p. 3-22). The statement's description of the pond does not match the existing or proposed pond. The certification statement should be removed and replaced with one that is current and accurate.

Siltation Structures: Sedimentation Ponds

According to the report prepared by Earthfax Engineering (Volume 5, Section 15a of the MRP), the WRP Sedimentation Pond drainage area is divided into two watersheds for a total watershed area of 18.7 acres. The two watersheds were divided into seven sections to provide curve numbers based on soil type, vegetation cover, and slope angle (Appendix B). Runoff from the watersheds is conveyed to the sedimentation pond through two ditches, DD-16 and DD-17 (described above). The watershed characteristics were used to model the 10-yr, 24-hr, 25-yr, 6-hr, and 100-yr, 6-hr precipitation events using the HydroCAD 7.10 computer program. The input and output data for each run is provided in Appendix C. Based on the calculations provided, the pond has the design capacity to contain the runoff from the 10-yr, 24-hr precipitation event in addition to approximately two years of sediment storage.

The WRP Sedimentation Pond meets the hydrology Operation Plan for Sedimentation Ponds as provided in R645-301-732.200 and –742.200 for the WRP expansion. A brief description of how the R645 Coal Rules were met follows.

- R645-301-711.300, All methods and calculations are provided in a report prepared by Earthfax Engineering presented in Volume 5, Section 15a of the MRP, Analysis of Sedimentation Pond Capacity Following Waste Rock Pile Expansion, Skyline Mine, Scofield, Utah.
- R645-301-742.221.31, Sediment runoff volume was calculated using an adaptation of the USDA Universal Soil Loss Equation (USLE) for each contributing watershed. The annual sediment inflow is calculated at 0.24 acre-feet (10,330 ft^3) (Appendix B). The existing pond can contain 60% of the calculated annual sediment inflow before the cleanout level is reached. The amendment calls for raising the elevation of the inlet to the decant pipe 1.9 feet to increase the sediment storage capacity of the pond. This would allow a sediment storage capacity of 0.48 acre-feet (10,787 ft^3); or two years of calculated sediment inflow. The new cleanout level will be one-foot below the decant inlet, which corresponds to 60% of the new storage capacity. With the raising of the decant inlet, the pond is adequately designed to contain the 10-yr, 24-hr storm event in addition to the 0.48 acre-feet of sediment runoff.
- R645-301-742.221.32, Adequate detention time is accounted for to meet the required UPDES effluent limitations because the pond is designed to fully contain the 10-yr/24-hr storm event.
- R645-301-742.221.33, The Permittee has provided adequate information to demonstrate that the pond is designed to contain the water and sediment for the 10-yr, 24-hr storm event. The peak stage corresponding to 100% of the storage capacity (0.48 acre-feet) combined with the 10-yr, 24-hr storm event (0.8 acre-feet) is 0.5 feet below the elevation of the principle spillway.
- R645-301-742.221.34, The pond is equipped with a 8-inch diameter decant pipe with a 90 degree elbow that will be positioned one foot above the cleanout level

and fitted with a gate valve to control retention time. The spillway consists of a swale that will adequately pass the designed outflow event.

- R645-301-742.221.35, Short-circuiting will be minimized (in the event of a discharge) because inflow ditches are located across the pond from the spillways, as is standard practice for short circuit prevention.
- R645-301-742.221.36, The pond clean-out level is presented with the stage elevation table (Table 2, Summary of Sedimentation Pond Hydraulics). The cleanout level will be one-foot below the decant inlet when the inlet is raised 1.9feet.
- R645-301-742.221.37, The existing sedimentation pond design was approved and constructed in the 1980s. The WRP expansion will not alter the construction of the pond, except for the raising of the decant inlet 1.9 feet.
- R645-301-742.221.38, The existing sedimentation pond design was approved and constructed in the 1980s. The WRP expansion will not alter the construction of the pond, except for the raising of the decant inlet 1.9 feet.
- R645-301-742.221.39, The existing sedimentation pond design was approved and constructed in the 1980s. The WRP expansion will not alter the construction of the pond, except for the raising of the decant inlet 1.9 feet.
- R645-301-742.222, The pond does not meet the size or other qualifying criteria of the MSHA, 30 CFR 77.216(a).

The Skyline Mine MRP should discuss a commitment to operate the WRP sedimentation pond such that at least 90 percent of the water stored during the design precipitation event will be removed within a 10-day period following the event.

Siltation Structures: Alternate Sediment Control Structures

One Alternate Sediment Control Structure (ASCA) is located within the WRP permit area (ASCA 24). The description of ASCA 24 in Section 3.2.12 of the MRP (P. 3-71) needs to be updated to reflect the increase in acreage of the WRP permit area.

Discharge Structures

Discharge from the WRP sedimentation pond should be controlled to reduce erosion and to minimize disturbance to the hydrologic balance. As shown on Plate 3.2.8-4, discharge structures include a plunge pool and ditch UD-7 at the decant pipe outlet, and ditch UD-4 at the emergency spillway outlet. The hydrologic design criteria for these structures are not presented in the amendment or existing MRP.

Impoundments

The WRP sedimentation pond is the only impoundment within the WRP permit area and is addressed in the findings discussions above.

Ponds, Impoundments, Banks, Dams, and Embankments

The WRP sedimentation pond is the only pond or impoundment affected by the WRP expansion.

Findings:

The amendment does not meet the Operation Plan for Hydrologic Information. Deficiencies that must be addressed prior to approval are listed below.

R645-301-742.221.32, The MRP presents the EPA issued NPDES permit UT-0023540 in two places sections: Volume 1, Section 2.3, Exhibit 2.3-1; and Volume A-1. Both permits have expired and do not indicate an outfall for the WRP sedimentation pond. Table 2.3.7-3 of Section 2.3 of the MRP lists four NPDES outfalls for the Skyline Mine including outfall 003 for the Waste Rock Area. The MRP does not list sampling requirements, including effluent limitations, for current UPDES outfalls. The existing UPDES permit should be included and expired NPDES permits should be removed from the MRP.

R645-301-742.300, Plate 3.2.8-1 of the amendment shows five swales (SW-13, 14, 17, 18, and 19) and seven ditches (UD-6A, UD-6B, and UD-6C, UD-4, UD-7, DD-14, and DD-15) that do not report to the sedimentation pond. Design and calculations for these diversions should be presented in Volume 5, Section 14 of the MRP, Drainage Control Waste Rock Disposal Site. This section should be updated to show the proposed and/or existing drainage controls within the WRP permit area.

R645-301-746.212, The waste rock pile amendment demonstrates that ditches DD-16 and DD-17 are designed for peak flow depths and velocities in response to the 10-yr, 6-hr precipitation event. However, ditches that receive runoff from a refuse pile must be designed to safely pass the runoff from a 100-yr, 6-hr precipitation event.

R645-301-746.340, The MRP should discuss a commitment to operate the WRP sedimentation pond such that at least 90 percent of the water stored during the design precipitation event will be removed within a 10-day period following the event.

R645-301-742.212, A certification statement for the WRP sedimentation pond, dated March 15, 1991, is located in Section 3.2 of the MRP (p. 3-22). The statement's description of the pond does not match the existing or proposed pond. The

certification statement should be removed and replaced with one that is current and accurate.

R645-301-742.100, The description of ASCA 24 in Section 3.2.12 of the MRP (P. 3-71) needs to be updated to reflect the increase in acreage of the WRP permit area.

R645-301-744.100, Discharge from the WRP sedimentation pond should be controlled to reduce erosion and to minimize disturbance to the hydrologic balance. As shown on Plate 3.2.8-4, discharge structures include a plunge pool and ditch UD-7 at the decant pipe outlet, and ditch UD-4 at the emergency spillway outlet. The hydrologic design criteria for these structures are not presented in the amendment or existing MRP.

In addition, it should be noted that there are be two commitments made by the Permittee to comply with during the operation of the sedimentation pond.

1) The ditches are considered non-erosive with peak flow velocities calculated below five feet-per-second (fps). The upper DD-16 ditch was assumed to be self-armored with D_{50} = 4 inch riprap from the accumulation of material from the WRP. The Permittee commits to closely monitoring the channel to ensure that this assumption is correct.
2) At least 90 percent of the water stored during the design precipitation event will be removed within a 10-day period following the event.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Mining Facilities Maps

The Permittee has met the requirements of R645-301-731.740. The expanded WRP permit area and associated hydrologic structures are updated on Plates 3.2.8-1, 3.2.8-2, and 3.2.8-4. The Pasture Pond design and cross section are provided on Plate 3.2.8-4.

Certification Requirements

The application has met the requirements of R645-301-712, and R645-301-733.210. A registered professional engineer has properly certified Plates 3.2.8-1, 3.2.8-2, and 3.2.8-4. As noted in a deficiency above, a certification statement for the WRP sedimentation pond, dated March 15, 1991, is located in Section 3.2 of the MRP (p. 3-22). The statement's description of

the pond does not match the existing or proposed pond. The certification statement should be removed and replaced with one that is current and accurate.

Findings:

The application meets the Operation Plan for Maps, Plans, and Cross Sections.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

As currently planned, the WRP sedimentation pond will be removed and reclaimed according to Plate 4.16.1B. The pond will not be removed if it is determined that the pond holds natural runoff water and will be beneficial for livestock and wildlife use. Plate 1.16.1C shows the WRP permit area with the pond in place following reclamation. Authorization by the Division is required if the pond is to remain following reclamation. The Permittee will need to demonstrate that the requirements of R645-301 -552.200, -733.220, and -760 are met.

All ditches are to remain following reclamation. Deficiencies identified in the Operations Plan for ditches must be addressed in order to comply with the Reclamation Plan requirements (R645-301-761).

Findings:

The Hydrologic Information of the Reclamation Plan application does not meet the requirements of the R645 Coal Rules. The following deficiency must be addressed prior to approval:

R645-301-761, All ditches are to remain following reclamation. Deficiencies identified in the Operations Plan for ditches must be addressed in order to comply with the Reclamation Plan requirements.

In addition, it should be noted that there are be one commitment made by the Permittee to comply with if the sedimentation pond is to be left as a permanent impoundment following reclamation. Authorization by the Division is required if the pond is to remain following reclamation. The Permittee will need to demonstrate that the requirements of R645-301 -552.200, -733.220, and -760 are met.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Two plates are provided in the amendment showing reclamation with the sedimentation pond removed (Plate 4-16-1B) and the pond remaining as a permanent impoundment (Plate 4-16-1C).

Certification Requirements.

The application has met the requirements of R645-301-712, and R645-301-733.210. A registered professional engineer has properly certified Plates 4-16-1B and 4-16-1C.

Findings:

The application meets the Reclamation Plan for Maps, Plans, and Cross Sections.

RECOMMENDATIONS:

The WRP expansion application does not meet the requirements of the relevant hydrology regulations. Deficiencies identified in this hydrologic memo need to be addressed prior to approval.